Cal. 1, P. 9

S

REPORT

OF

PROCEEDINGS

MEETING OF THE TRUSTEES

WESTERN WHITE PINE BLISTER RUST CONFERENCE

HELD IN

PORTLAND, OREGON

December 4, 1926.

CONTENTS

	Page
Report of the Executive Secretary and Treasurer, by C. S. Chapman	1
Federal and State Participation	1
Projects to be Carried Forward	2
Progress in Control of the Disease, by S. N. Wyckoff	4
Cultivated Black Currant Eradication	4
Experimental Ribes Eradication in Idaho	4
Control Reconnaissance in Idaho and Montana	7
Ecological Studies	9
Experimental Ribes Eradication and Reconnaissance, California	10
Spread of the Rust	12
Federal Quarantine 63 and its Requirements, by C. R. Stillinger	14
Western Blister Rust Investigations, 1926, by H. G. Lachmund	19
Distribution of the Rust on Pines	19
Distribution of the Rust on Currants and Gooseberries	20
Influence of Weather Conditions upon Spread and Development	20
Susceptibility of Ribes	21
Damage to Western White Pine	22
Susceptibility of Sugar Pine and Other White Pine Species	23
The Ten-Year Program Today and Tomorrow, by H. P. Barss	24
Modified Ten-Year Blister Rust Program	25
Cooperative Blister Rust Work in Idaho, by W. D. Humiston	29
Cooperative Blister Rust Work in Washington, by G. C. Joy	30
Cooperative Blister Rust Work in Forest Service, District I, by Fred Morrell	30
British Columbia Situation, by A. T. Davidson	30
Need for Further Study of Growth and Yield in the Western White Pine Type in Relation to Blister Rust Control, by R. H. Weidman	31
Resolutions	35
Attendance List	39

REPORT OF PROCEEDINGS, MEETING OF TRUSTEES

of the

WESTERN WHITE PINE BLISTER RUST CONFERENCE

PORTLAND, OREGON.

DECEMBER 4, 1926.

* * *

The meeting was called to order at 10 A.M. by Mr. Park, Chairman of the Trustees of the White Pine Blister Rust Control Conference.

Mr. Park: We are assembled in our sixth annual conference to review the work of the year, consider plans for the future, and make whatever recommendations seem necessary. We shall first hear from the Secretary, Mr. Chapman.

REPORT OF THE EXECUTIVE SECRETARY AND TREASURER
by
C. S. Chapman.

Actual work looking to control of white pine blister rust in the West will be fully covered by those who are in charge of this project and need not, therefore, be commented upon in this report.

Since discovery of the disease in British Columbia in 1921, meetings of the Western White Pine Blister Rust Conference have occurred annually, either as general meetings or as open ones of the Trustees, to which all interested persons have been invited.

The Conference has served a two-fold purpose--first, through its general meetings and through Committee activities, it has acted as advisor to the Federal Office of Blister Rust Control and State Officials; second, it has been principally instrumental, with the aid of many good supporters, in securing Federal recognition of the Western control problem.

I feel that we have been particularly fortunate in that our Federal, Provincial and State authorities have taken up the work of blister rust control in such a thorough and common sense manner. Had it not been for their ability and willingness to work together toward a common goal, a report of a steady progress might well be an impossibility.

1. Federal and State Participation

As stated on numerous occasions, it would seem that one of the principal functions of this Conference is to impress upon Federal and State bodies the need for systematic support of the work. It may be of interest to tabulate the sums so far appropriated by Congress for control quarantine and investigative activities: Fiscal years 1922 and 1923 - $150,000, 1924 - $92,000

1925 - $125,000, 1926 - $140,000, 1927 - $160,000, making a total of $667,000.

In 1923, a 10-year program was adopted by the Conference as it was apparent that expenditures should, so far as possible, be budgeted. uring two years - 1924 and 1927, we failed to secure the Federal aid recommended in the program, in spite of the excellent support given by our Western Congressional delegations. Last year it was found necessary to depart from our 10-year program and ask greater aid because of advance of the disease into Oregon. The increase ($73,500) was considered well within reason by the Department of Agriculture, but what action will be taken by the Director of Budget is not yet known.

It also became apparent that further study of white and sugar pine growth and yield was required as a basis for determining where and when local control was justified. To provide for this, Mr. Johnson, of Washington, introduced a Bill contemplating an appropriation of $50,000 for this project. The Bill was not acted upon by the last Congress but should be at the coming session. In the meantime the Forest Service has been asked for a report on the need for this work and it is hoped will pass upon it in a favorable manner.

Our States in the meantime, while not actually appropriating considerable sums for blister rust work, have, through their forestry, horticultural and agricultural departments, contributed large sums in the form of services of their regular forces, and private agencies have taken similar action as well as assigning special men to the work. In order, however, to bring the project even more closely home to all agencies responsible for care of white and sugar pine timber areas, the studies of growth and yield are extremely desirable. The sooner these are available, the sooner can the work be confined to those places where it will count for most.

2. Projects to be Carried Forward.

In addition to the work of local control, experimental work, nursery inspection, quarantine, scouting and completion of black currant eradication in California, Idaho and Washington - all of which must be pushed at the highest possible rate of speed, there are several matters to which the Conference must give immediate attention.

1st-Securing of adequate Federal aid with which to carry forward our revised 10-year program. It now appears that there will not be need to send a representative to appear before the House Appropriations Committee which Committee is in session. This is because of the active support given our program by Western Congressmen, particularly Mr. Johnson of Washington, and Idaho, Oregon, Montana, and California members.

2nd-It is important that Mr. Johnson's Bill to provide funds for study of white and sugar pine receive favorable consideration before the Appropriations Committee. At present this provides funds for the Missoula Experiment Station and study of western white pine alone. It should probably be amended to cover sugar pine as well and the funds available in part for the California Station.

3rd-Effort should be continued in our various states to secure more direct recognition of the blister rust problem. This may well cover the field of direct appropriations and legislation making cultivated black currant a public nuisance in those states where such law does not now exist.

4th-The question of finances with which to carry on general work of the Conference must soon be up for consideration. While no considerable sum is required, the amount in the treasury at the present time makes impossible undertaking any project requiring expenditure of funds.

5th-It is suggested that a very brief history of blister rust activities in the West, what has been done, what is under way and need for following out a systematic program be prepared by the Office of Blister Rust Control and widely distributed.

We should not lose sight of the need for continually keeping our problem before the public if we expect continued public support.

Mr. Chapman: I wish to call your attention to the fact that the monies spent by state and private agencies exceed that of the Federal Government. I have received word from Mr. Johnson that he will appear personally before the Appropriations Committee. Also the other western members of Congress have assured me that they will appear personally before the Appropriations Committee. Since our western members of Congress are taking care of this matter, there does not seem to be any need of the Conference sending a representative to appear before the Appropriations Committee. I have also received word from Messrs. Kjosness, Barnes, and Bowman, expressing their interest in the Conference and their regrets that they are unable to attend. I have a wire from Senator McNary to Mr. Park which I will read:

TELEGRAM

Washington, D. C., Dec. 1, 1926.

Charles A. Park
President Oregon State Board of Horticulture
Salem Oregon

Letter concerning appropriation for western blister rust control received (stop) House Subcommittee has finished hearings on appropriation bill and it will come to the Senate Committee of which I am Chairman some time the latter part of December (stop) Will keep your suggestions in mind. Discussed matter with Colonel Greeley today and he thought one hundred sixty thousand was sufficient fund and I am referring the matter to him for collection of data and will give the subject my personal attention.--Chas. L. McNary.

Mr. Park: We shall now take up the consideration of last season's work by Mr. Wyckoff, of the Office of Blister Rust Control.

PROGRESS IN CONTROL OF THE DISEASE

by

Stephen N. Wyckoff,
Pathologist, Office of Blister Rust Control.

It is my purpose to give you a complete report on the activities of the Western Branch of the Office of Blister Rust Control during the calendar year of 1926. Our work during this period has been conducted under the projects laid down in the 10-year program. This report will cover our work under the titles of these projects.

1. Cultivated Black Currant Eradication.

In accordance with the program for the general control of the disease in the West, cultivated black currant eradication has been carried on in those portions of Montana, Idaho, Washington, and California which had not previously been covered. Oregon was completed in 1925, so no further work was necessary in that state.

Montana: every county in the state has been worked. Of 502 plantings located in the state, 488 have been removed. Since there is no state legislation concerning the cultivated black currant in Montana the remaining 14 plantings can only be removed when our State Leader secures the permission of the owners. No further crew work will be necessary in Montana.

Idaho: five whole counties and portions of three others remain to be worked. The unworked area is in the southeast corner of the state, a region which seems to contain many of these plants. During the past season, 638 plantings, representing 6,560 plants, were eradicated. Of these, 591 plantings, representing 5,840 plants, were given without compensation. For the other 47 plantings, of 720 plants, the State of Idaho paid $308.55, or an average of 43 cents per bush.

Washington: all of eastern Washington except Kittitas and Chelan counties, part of Yakima County, and the City of Spokane are now completed. This area should easily be finished next summer.

California: during 1926, 13 counties in the north-central part of the state were worked. A total of 43 plantings, representing 239 bushes, were eradicated. Somewhat less than one half of the State of California is now completed.

2. Experimental Ribes Eradication in Idaho.

The experimental Ribes eradication of the past season was conducted on the southern part of the Kaniksu National Forest in northern Idaho. This area is some 25 miles south of the scene of the work in 1924 and 1925, and was chosen for the following reasons:

1. It constituted good representative white pine type, and contained a number of different age-classes.

2. It contained three species of Ribes (the 1924 and 1925 areas contained but two), and also the swamp condition along the streams which is quite typical of the Idaho white pine region.

3. It represented a favorable opportunity for better development of scouting methods, that is, working areas containing relatively few Ribes by more extensive and cheaper methods.

A force of 70 men was put on this area in June, working until September 15. As a result of the serious fire emergency which occurred on the Kaniksu National Forest during July and August, these men were called for fire suppression duty by the Forest Service, 33 days being devoted to this work. Thus, out of a total of 5,600 man-days, available during the summer for experimental Ribes eradication work, 2,310, or 41% were spent on fire suppression. The real loss to our program, however, cannot be measured in man-days lost, but rather in experimental work which is uncompleted with resultant delay to the proper development of better methods.

In spite of this interruption, 8,865 acres of land were worked, at an average cost of $1.26 per acre. As a result of the checking done on this eradication, the efficiency was found to be 93%.

The following table gives the results of this work in greater detail:

Table No. I.
Experimental Ribes Eradication, Idaho.

Eradication Type	Ribes per Acre				Acreage Worked	Cost per Acre
	R. lacustre	R. viscosissimum	G. inermis	Total		
Dense Mature	2	-	-	2	465	$ .32
Dense Pole	6	1	-	7	1612	.53
Dense Reproduction	15	1	-	16	940	1.13
Open Mature	10	-	-	10	573	.69
Open Pole	8	20	-	28	4301	.80
Open Reproduction	11	3	-	14	472	.83
Stream	267	9	159	435	502	9.87
Totals and Averages	23	10	10	43	8865	$ 1.26

My report to the Conference in 1925 showed that our experimental Ribes eradication for that year in the Upper Priest River Valley had resulted in an average cost of $3.38 per acre, with 86 Ribes per acre. The cost per acre this season is so much less that an analysis of the two sets of figures on costs and working conditions may reveal information of value.

The cost of Ribes eradication will always vary according to several factors. These are, briefly, as follows:

1. Proportion of the different eradication types on the areas concerned.

2. The number of Ribes per acre.

3. The roughness of the terrain, affecting working conditions.

4. The location of the area, affecting cost of transportation of men and supplies.

5. The efficiency of the organization on the ground and the eradication methods used, affecting the amount of work done per man-day.

The first four of these points are, of course, not subject to control. Such variations account for the reason that the cost per acre will vary one from the other on any areas worked. Indeed, these four factors are of such importance that they may easily outweigh the fifth, which can be controlled. In other words, a poorly organized and very inefficient field project might show a lower per acre cost on one area, readily accessible, low in Ribes and representing easy working conditions, than a highly efficient organization on a more difficult area. It is for this reason that we hesitate to apply per acre costs, secured during any single season on an area representing a special set of conditions, to large tracts of land which may, in the aggregate, represent quite different conditions.

It is the function of this Office to experiment upon methods of Ribes eradication and to build up an efficient field organization capable of securing the lowest costs possible in relation to these natural and uncontrollable factors. Eradication costs will always vary on different areas, but we should seek the irreducible minimum cost for each set of conditions.

I am very glad to be able to report that chemical eradication of Ribes, where these plants occur in great profusion, now appears to be feasible, and to represent a possibility for a considerably reduced eradication cost. The experimental work on this project has now progressed to the point that we can state the following:

1. Ribes, and particularly R. petiolare, the wild black currant, a species very susceptible to blister rust and which occurs in great profusion in swampy areas, can be killed by one application of a spray.

2. The chemicals being developed are not toxic to men or animals, and thus offer no danger of poisoning live stock or pollution of streams.

3. The present methods of application of chemicals to Ribes, in swampy bottoms, while as yet in an undeveloped stage, show a 35% lower cost and a higher efficiency than hand eradication.

The chemical eradication of Ribes is capable of much development. While the results to date are very encouraging, we are still experimenting with numerous chemicals, and have as yet had little opportunity to study methods of application. I feel very sure that by this means the cost of eradication in the Stream Type will be materially lowered.

3. Control Reconnaissance in Idaho and Montana.

As part of the local control program, and in order to secure more rapid information concerning the extent of eradication types, the occurrence of Ribes, and differences in working conditions than in possible by experimental eradication, control reconnaissance was conducted in the white pine type in Idaho and Montana. This work has been organized as two projects as follows:

1. Control reconnaissance on National Forest lands; an extensive survey to determine by the cheapest and most rapid means possible the extent and location of the various forest and eradication types on the National Forests. To secure this information, all possible use is being made of Forest Service records.

   During the past season this work has been conducted on the Coeur d'Alene National Forest, and to a lesser extent on the St. Joe National Forest. By means of both extensive and intensive reconnaissance 353,920 acres of land were covered. The cost for such work has been 1/2 cent per acre for the extensive and 2 cents per acre for the intensive reconnaissance, or a cost of 3/4 cents per acre for all land covered.

2. Cooperative work on private lands. This has taken the form of reconnaissance, more intensive in nature than that on the National Forests, and is designed to give the pine owners a clear picture of eradication conditions and ultimately of eradication costs on their lands. This work has been financed upon a cooperative basis, each of the five timber protective associations in north Idaho expending half of the funds required for the work on its lands. Through their support of this work, the timber owners of north Idaho are actively assisting in the necessary preparation for local control on their lands. Two purposes are being accomplished. Their forest lands are being classified as to timber type and age-class, and preliminary information of great value to a local control program is being secured. Each association is also assisting in the development of a man, properly qualified as to blister rust control work, and familiar with the lands and conditions in his association, to whom it can turn when the inevitable time comes that blister rust is found in north Idaho.

I cannot emphasize too strongly the value of this arrangement. Blister rust is now firmly intrenched in the region of Nelson, British Columbia, and is probably only waiting for a season of favorable weather conditions to spread onto Ribes in north Idaho. This will be followed by incipient pine infection, and the time for immediate action will have come. Further delay would mean pine infection and damage the extent of which would only be apparent some years later. When that time comes, the relatively small organization and personnel of the Western Office of Blister Rust Control will be inadequate to cope with the situation. The value to the pine owners of these blister rust leaders who are now being developed by the associations will at once become clearly apparent. The pine owners are to be commended for their foresight in now taking this step which will represent an excellent investment a few years hence.

The results of the reconnaissance work on the five associations of north Idaho during the past season are as follows:

Table No. II.
Acreage and Cost of Reconnaissance
Private Lands, Idaho.

Association	Acreage Reconnaissanced	Cost per Acre of Reconnaissance
Pend Oreille	33,280	$ .028
Priest Lake	39,680	.023
Coeur d'Alene	46.200	.035
Potlatch	42,240	.027
Clearwater	38,400	.028
Total	199,800	$ .029 Ave.

Control reconnaissance in Montana, undertaken this season for the first time, has consisted of a rapid survey of the best stands of western white pine. A total of 51,200 acres of land was reconnaissanced at a cost of 3 1/2 cents per acre.

Application of the results of this season's experimental Ribes eradication to the figures secured by control reconnaissance in Idaho reveal some points of interest. The figures used represent only white pine type and forested areas immediately contiguous to white pine type, which were covered by intensive reconnaissance. The following table shows the results:

Table No. III.
Estimated Costs of Ribes Eradication

Type	Private Ownership			National Forest			Average		
	Acreage	Ribes per Acre	Cost per Acre	Acreage	Ribes per Acre	Cost per Acre	Acreage	Ribes per Acre	Cost per Acre
Dense Mature	26,382	7	$ .47	5,263	35	$ .91	31,645	11	$ .54
Dense Pole	5,921	9	.55	870	13	1.16	6,791	9	.63
Dense Reproduction	10,126	32	1.54	6,325	52	2.95	16,451	39	2.08
Open Mature	74,978	12	.82	12,842	59	2.39	87,820	19	1.05
Open Pole	11,555	10	.60	640	13	.71	12,195	10	.60
Open Reproduction	25,536	46	1.68	8,270	50	1.96	33,806	47	1.75
Stream	1,855	267	7.14	2,351	198	6.58	4,206	228	6.83
Totals and Averages	156,353	21	$1.00	36,561	59	$2.38	192,914	28	#1.26

The costs given in this table are not to be considered as accurate. They are merely the application of this season's experimental Ribes eradication to the conditions existing on the territory reconnaissanced. Such an application, at the present stage of our work is of indicative value only. But it shows the ultimate use to which reconnaissance data are put. Several more seasons of experimental Ribes eradication should permit us to make such a tabulation which will be generally correct, over large areas. The most striking point is the variance in number of Ribes per acre and eradication costs between National Forest and privately owned timber lands in north Idaho. This is to be expected. In general, the National Forest lands here considered represent areas of higher proportion of land approaching the sub-alpine type, than the private ownerships. It is also significant that in the stream type the private ownerships contain more Ribes per acre than the National Forests. At lower altitudes the species of Ribes occurring in the white pine belt tend to grow in concentrations along the streams rather than in general distribution along the slopes.

4. Ecological Studies

Ecological studies on the growth habits of Ribes are being carried on as an aid to the Ribes eradication work. Such studies consist of two operations:

1. Careful examination of Ribes eradication and control reconnaissance records to secure all possible information and leads for field work.

2. In light of the above, and of the needs of the Ribes eradication work, field studies are conducted to secure information on definite points.

Such field studies are now being conducted to secure much needed information on the following subjects:

1. Relation of leaf area to live stem for different species and growth forms of Ribes.

2. Rate, distance and manner of seed dispersal of Ribes.

3. Conditions within the forest favorable or unfavorable to Ribes seed germination, seedling establishment, and plant survival.

4. General growth habits of Ribes.

As a result of such field studies, and of a critical examination of other data in our records, certain generalities concerning Ribes are becoming apparent.

1. The white pine belt of Idaho contains four Ribes species of major importance, the wild black currant (R. petiolare), the white stemmed gooseberry (G. inermis), the sticky currant (R. viscosissimum), and the prickly currant (R. lacustre).

2. The wild black currant and the white stemmed gooseberry occur only in moist soils of relatively poor drainage. They are found in very great profusion in swampy areas within the white pine type. They propagate themselves largely by such a vegetative method as layering. While expensive to eradicate, because of their great numbers on small swampy areas, they are, by this very fact, particularly susceptible to chemical eradication. It also seems probable that they will re-establish themselves very slowly, if once thoroughly eradicated.

3. The sticky currant prefers upland, dry, warm sites. It is the principal species on burns and in young, poorly stocked timber stands. Because of its intolerance to shade, it normally represents a temporary Ribes type. It is probable that if it is thoroughly eradicated, so that its seedling power on an area is broken down until the forest canopy closes, it will be unable to re-establish itself during the life of that timber stand.

4. The prickly currant is the least exacting Ribes species with which we must deal. It can endure either shade or considerable sunlight. Its moisture requirements are not rigid. For these reasons, it will probably be the most difficult species to eradicate. On the other hand it is relatively low in susceptibility to the rust.

5. Experimental Ribes Eradication and Reconnaissance, California.

During the season of 1926, the first experiments in Ribes eradication were undertaken in the main part of the sugar pine belt of California. Three thousand one hundred and thirty-four acres of land on the Stanislaus National Forest were worked by a small field organization. The

results of this work are given in the following table:

Table No. IV.
Experimental Ribes Eradication, California

Eradication Type	Ribes per Acre				Acreage Worked	Cost per Acre
	G. roezli	R. nevadense	R. hallii	Total		
South Exposure Mature	7	-	-	7	430	$ .30
South Exposure Cutover	37	-	-	37	346	1.99
North Exposure Mature	26	3	-	29	793	1.52
North Exposure Cutover	149	2	-	151	144	3.64
Stream Mature	54	55	-	109	301	4.54
Stream Cutover	458	46	-	504	87	7.89
Brush	67	10	1	78	548	3.88
Thicket	½	-	-	½	125	.09
Mixed	16	1	-	17	135	.62
Totals and Averages	50	9	-	59	3134	$2.22

A careful check of the California experimental eradication project shows that the work done was 92% efficient, that is, 92% of the bushes were found by the crews, and pulled.

It will be noted that the eradication types recognized in California are different from those of Idaho. The timber and general growth conditions are so unlike in these two regions as to preclude the use of the same types. A striking point encountered in this California work was the difficulty of eradication of the Ribes species occurring in the sugar pine belt. These plants are so difficult to pull that the use of tools is continually necessary.

Control reconnaissance in California, limited in scope during the past season, was conducted adjacent to the experimental Ribes eradication. The work was of an intensive nature, and was designed to work out methods suitable for the region. In all, 9,440 acres of land were reconnaissanced, at a cost of 4½ cents per acre.

In looking over the present status of our entire experimental local control project, both in Idaho and California, the results of our past year's work seem to well justify a greater feeling of optimism than was previously possible. Our Ribes eradication in Idaho shows a much lower cost figure than before, partially due to more favorable natural conditions, but also reflecting, in part, real progress in better methods of work. Chemical eradication now seems to be feasible and will doubtless constitute the solution of eradication of Ribes where they occur in dense concentrations, very expensive to eradicate by hand. Control reconnaissance has showed us that 44% of the area covered contained no Ribes, and 19% contained 1 to 10 per acre. Thus 63% of this area will constitute a very low eradication cost.

In general, all phases but one of the local control program are making satisfactory progress. Methods of Ribes eradication are being developed, and it is our hope that within a few years we shall be able to successfully cope with the inevitable invasion of the rust into our pine stands. But before we can begin the general application of these control measures we must know what areas represent sufficiently good white pine site to merit protection. This necessitates a basic classification of forest lands within the western white and sugar pine regions into permanent white or sugar pine sites and other sites. Such information, finally necessary, would be of inestimable value to us at the present time. If it were now available it would make possible a concentration of our experimental work onto those types and conditions where the work must finally be applied.

This important phase of the control program cannot be effectively done by our office. It is a forestry problem, and it is to the foresters that we must turn for its accomplishment. I should be glad to have the Conference give this matter careful consideration, and take whatever steps seem advisable to have this vital part of the program instituted.

6. Spread of the Rust.

The scouting work performed this fall in Montana, Idaho, British Columbia, Washington, Oregon and California did not show any further extension of the rust toward our white or sugar pine stands. Mr. Lachmund will tell you in his report, I believe, that this was an unfavorable season for the spread of the rust, and will explain to you the reasons for this.

We find, however, that the two focuses of pine infection, one on the Olympic Peninsula of Washington and one in the vicinity of Nelson, British Columbia, and which constitute the most active sources of extended infection in the western United States, are constantly increasing in size and intensity. More and more pines are becoming infected at these points, with a resultant increase in danger of further spread. These pine infection centers will continue to increase, and with the proper spring and summer weather conditions we may expect to find further extensions of the infected area, possibly at considerable distances from these centers.

In closing, I wish to express my appreciation of the assistance and advice that the Conference is giving to our Office, and to assure the Conference that to the best of our abilities we are endeavoring to carry out the 10-year program.

Mr. Morrell: In chemical eradication you spoke of killing the plants to the ground. Is there any danger that they will sprout?

Mr. Wyckoff: The experimental eradication in 1925 was done at Wallace, Idaho. The plants were killed to the ground that year. When they were

examined in 1926, many of the roots were found to be dead.

Mr. Humiston: The cost of eradication in California is twice as large as that in Idaho. Is this due to the difficulty in pulling?

Mr. Wyckoff: Only to a small degree. It was largely due to our lack of experience in the work under the different conditions in California and consequently to less successful methods. This cost figure should go down. We shall be able to decrease it.

Mr. Humiston: Then it was partly due to inexperience and the fact that the experiment was on a small scale?

Mr. Wyckoff: Yes. The seedling problem also caused an increased cost. We laid out plots which showed that 90 percent of the seedlings died during the season. We believe that it will be better to ignore the seedlings, pulling out only the large bushes which are producing seed. The seedlings will not produce seed for from four to six years. Consequently, we think that it will prove more feasible to pull out the older bushes the first time over and pull out the seedlings later, just before the bushes have produced seed. This should get all the seedlings which will grow from the seeds that are stored in the duff and largely free the area from Ribes.

Mr. Humiston: Will cattle and sheep eat Ribes?

Mr. Wyckoff: They will eat them some after eating everything else.

Mr. Humiston: Will bedding kill them out?

Mr. Wyckoff: Possibly.

Mr. Chapman: Did you mention the extent of the infection on the Olympic peninsula?

Mr. Wyckoff: I just mentioned the general points. There is quite extensive pine infection along the Puget Sound and on the Olympic peninsula.

Mr. Park: The Conference has received the following telegram from Mr. Detwiler:

TELEGRAM

Washington, D. C.
12/2/26

The outlook for the successful control of blister rust in the West is brighter than ever as a result of this year's work. I regret the small acreage of local control experiment in Idaho but this was inevitable due to the fire situation. We have no desire to shirk our responsibility of fighting fire but it must be clearly recognized that experimental results provided for in the ten-year program cannot be attained on schedule time if the force is disrupted. I am confident that the successful application of control will result from following the ten-year program.

The strength of the program is whole hearted cooperation of all interested in the future of white pine in the West. Since the Federal Government owns approximately half of the white pine acreage, its duty in this problem is possibly greater than that of the states which actually own comparatively small acreage. However, the communities and states are greatly benefited in wealth by lumbering operations. The nation at large is equally benefited through the lumber produced and through the potentialities of the future timber crop. It is impossible to determine the exact proportion of the cost that the states should bear but with the increased Federal activity, the cooperators should also increase their contributions. I believe that the time has arrived for the states to secure direct appropriations for control reconnaissance, scouting, and Ribes eradication on the most favorable sites. I hope that the Conference considers this matter carefully in order that we may be prepared to cope with the rust effectively. I believe that control reconnaissance as a basis for planning practical control work is one of the greatest present needs. The excellent cooperation of the Western Conference is responsible for the present success under the program. I hipe our work merits increased cooperation. Suggestions will be appreciated.--Detwiler.

Mr. Chapman: We had hoped that Mr. Detwiler would be with us but due to other things he was unable to be present.

Mr. Park: At this time I wish to appoint the resolutions committee. On this committee I wish to appoint Messrs. Barss, Joy, Humiston, Morrell, and Elliot . The next paper on the program is a discussion of the new blister rust quarantine by Mr. Stillinger.

FEDERAL QUARANTINE 63 AND ITS REQUIREMENTS

by

C. R. Stillinger,
Associate Pathologist, Office of Blister Rust Control

Due to the fact that conditions have changed considerably during the last few years, as far as the blister rust situation is concerned, and in the light of information obtained from investigative work, it has been felt for some time that the blister rust quarantines should be revised. Consequently a study of the entire situation was inaugurated, and as a result Federal Quarantine #63 was issued, effective October 1, 1926. This quarantine replaced Federal Quarantines #26 and #54 and their amendments.

There are three general requirements in Quarantine #63:

1. General regulations for the movement of all blister rust host plants are established in that all packages of blister rust host plants must have the name and address of the consignor and consignee, the contents listed on the outside of the package, and an inspection tag showing that the plants and premises were inspected within one year of the date of the shipment. This establishes a standard for the shipment of all blister rust host plants.

2. The quarantine makes all nursery shipments which may contain blister rust host plants subject to inspection by a Federal inspector at the point of origin, or destination, or at any intermediate point. This is the first time that provision has been made for inspection work, by a general Federal regulation.

3. The third regulation of general importance is the provision that any state which has established blister rust control areas has power of regulation over all shipments of blister rust host plants which are made into that state, in that the shipper must secure permission from the state of destination before any such shipments can be made. This is one of the most important regulations of the quarantine. It is expected that, as blister rust approaches, each state will select those areas which it considers should be protected from blister rust and will definitely declare such areas as control areas. This regulation really is in anticipation of such a step by the states and it is expected that all states which have white pine will establish such control areas.

The main points covered in the remainder of the quarantine may be briefly summarized as follows:

I. White Pines.

A. No white pine can be moved out of an infected state or part thereof (Oregon) to an uninfected state.

B. No white pine can be shipped west across the Mississippi Valley quarantine line as it was established by Quarantine #26.

C. Some interchange of white pine is provided for between the infected states in the East but none can take place between the infected state of Washington and that part of Oregon under quarantine.

II. Black Currants.

The movement of the cultivated black currant interstate is practically forbidden. Interstate shipments can be made only between a few states in the middle west and then only under very special provisions.

III. Other Currants and Gooseberries.

A. All currants and gooseberries, except cultivated black, may be shipped from uninfected states to any other states whether infected or not. However, if the state of destination has legally established control areas, a permit must be secured. In this case the state of destination, however, cannot refuse a permit if the shipment is not destined to go into the control area.

B. No currant or gooseberry plants are allowed to be shipped from infected states, except the red, white, and alpine currant and the cultivated gooseberry. This provision is a liberalization of former blister rust quarantines because up to the time of the present quarantine no currants or gooseberries could be shipped from any infected state. However, in order to make such shipments the following requirements must be complied with:

1. The shipment can be made only between October 1 and May 15, except in Oregon and Washington where the period is November 1, to April 15.

2. The consignor must have a certificate from a Federal inspector. In order to obtain this certificate, inspection must be made between August 15 and September 30, except in Oregon and Washington, the period is September 1 to October 31. The plants and premises and vicinity within a radius of one mile must be found free from blister rust and cultivated black currants.

3. The consignor must have a permit from the Federal Horticultural Board. This permit is granted only upon the receipt of the certificate of inspection from Federal inspector.

4. Each shipment must have the permit tag of the Federal Horticultural Board and a certificate from the consignor showing that the plants contained are the ones referred to under the Federal permit and that the plants were dipped in lime-sulphur.

5. The plants when shipped must be in a dormant and defoliated condition.

It is believed that this quarantine represents a real step forward both in matters pertaining to quarantines in general and in the development of blister rust control. The quarantine really standardizes the

the nursery business as far as the handling of blister rust host plants is concerned. At first glance it may appear to be rather complicated and cumbersome. It appears complicated because it covers the movement of these host plants between all of the states of the United States. Further, it substitutes for the embargo type of quarantine, a quarantine of regulation based on known scientific facts. Since we have become accustomed to the embargo type of quarantine, this one, therefore, seems complicated.

The Federal Horticultural Board realizes the necessity for the adjustment of the shipper, transporting agency, and state inspectors to this change. Consequently, its effort is to aid in this readjustment by educational means. It is possibly due to the fact that one tries to grasp the whole quarantine that it appears complicated. However, the parties in each state need to know only the relation of their one state to all other states as to receipt of stock from these states and the requirements for shipments from their state to any other state. The interstate relations between other states does not concern them. If this quarantine is studied from this viewpoint, it will be found to be relatively simple. As occasion arises, we are aiding each state in the development of such an outline. As for the shipper, our effort is to call his attention to mistakes or omissions in detail and not hold him to every technicality of the quarantine until he is fully informed. If a shipment fulfills the primary requirements of the regulations it is passed. It is believed that nurserymen will soon become acquainted with the regulations. The private individual presents quite a different problem. In this case every employee of any transporting agency must know the requirements of the quarantine in order to see that the shipment is properly prepared for shipment and he must know what to do with the package in order to get it inspected. Further the states must make provision for prompt inspection. The situation as far as parcel post is concerned is possibly well taken care of in the case of states which have terminal inspection. In the case of the express and freight transportation, the situation is more difficult and more expensive to the shipper. Unless considerable attention is given to the problem of the private shipper, it will be generally impossible for him to ship blister rust host plants under this quarantine. It must be remembered that the adjustment to these new regulations must be gradual and that it will require the best effort of all parties concerned to develop the situation to this highest point of efficiency. From the viewpoint of the general development of the quarantine problem, as well as the blister rust situation, it is our thought that the result will justify the best effort of all parties concerned.

In concluding this discussion I want to emphasize again the third general provision of this quarantine, that is, the provision for the establishment of control areas in a state. Our problem has now progressed to the point where it is highly desirable and in fact imperative, that the definite areas which have white or sugar pine and which are threatened by blister rust, be delimited. The very first step in the protection

of these areas is provided in Federal Quarantine 63. Once these control areas are definitely established, the further planting of currants and gooseberries in that area is stopped. This is one of the first steps in the actual control program. The execution of this step rests with the police machinery of each state and will be applied to all control areas that are established.

The establishment of such areas, therefore, provides for two things: First, the gradual reduction of the number of planted Ribes in the area. This means less Ribes to pull out later and less Ribes to help distribute the disease. Second, it means less chance of the disease being introduced by the shipment of planted Ribes stock. The third and final step in the protection of the area will be the actual systematic removal of all of the wild and cultivated Ribes in the area. Then the protection of the area will be complete.

Mr. Wyckoff in his paper has called your attention to the necessity at this time of determining the areas of white and sugar pine which are worth protecting. Further, he has called attention to the fact that this cannot be considered the work of the Office of Blister Rust Control. We believe that this is the work of the actual custodians of the forests. In other words, the responsibility for determining these areas rests with the Forest Service, the State and the private owners. These are the agencies which must say finally what areas are to be protected and where they are located. We need this information now in order to direct the location of our reconnaissance and experimental eradication work, and it is imperative to the work of the Federal Horticultural Board and each state in making effective the first two actual steps in practical control. Since the execution of these two steps rests largely with the police machinery of the State, both in legally establishing these areas and in the execution of this particular phase of the control work, it seems that the initiative in this work should be taken by each state. It appears to me that this is a definite project which the states must start at once. A brief outline of the project appears to me to be somewhat as follows:

1. The State Departments of Agriculture or Horticulture should determine at once whether they have proper authority to establish control areas. If they have not, they should take steps to establish such authority.

2. The Blister Rust Executive Committee of each state should call into consultation the Forest Service, State and private agencies, and make plans for the definite location of control areas, and direct the execution of the work. The more specific these areas can be made the less necessity for changes later.

3. The Blister Rust Executive Committee of each state, upon the completion of its project, should certify these areas to the State Department of Agriculture or Horticulture.

4. Acting upon this information, the state would issue the proper orders legally establishing the control areas.

5. Upon the establishment of the areas the state and Federal Horticultural Board will cooperate to make effective the provisions of Quarantine 63 and the state quarantine establishing the control areas.

6. The Office of Blister Rust Control will direct its work in each state according to the control areas established.

The result of this project will be the actual determination of the white or sugar pine areas in each state. This will not necessitate the actual division and valuation of these areas as to the costs and desirability of putting into effect the third step of the control measure. This final division of the control area into units, which are to be completely protected by local control or eradication of all Ribes, is a matter for more detailed examination by foresters who alone can judge what potentiality is represented in each area and what costs for protection from blister rust it will bear.

Mr. Park: If there are no questions regarding Mr. Stillinger's paper, we shall now hear from Mr. Lachmund, of the Office of Forest Pathology, who has been carrying on the investigative work.

WESTERN BLISTER RUST INVESTIGATIONS, 1926

by

H. G. Lachmund,
Assistant Pathologist, Office of Forest Pathology

Western investigations of white pine blister rust in 1926 were concentrated upon the following:

Annual distribution studies.
Influence of weather conditions upon spread and development.
Susceptibility of Ribes.
Damage to western white pine.
Susceptibility of sugar pine and other white pine species.

Annual Distribution Studies

On the Pines

New outlying centers of pine infection were found as follows: six more in the Puget Sound region of western Washington; two more in the district of Nelson, B. C., 43 and 49 miles north of the Idaho border; five in

the Sugar and Mabel Lakes region within the interior white pine belt of British Columbia, and a number in the upper Birkenhead watershed in the coastal region of British Columbia. (Discoveries in the first two cases resulted from scouting by the Office of Blister Rust Control; in the latter two districts, during the course of distribution studies by this Office.) In all cases the centers were of relatively recent origin. Data from the different localities indicate earliest infection of pines in the oldest of these centers in each district as follows:

Puget Sound region - - - - - - - - - - - - 1917 or 1918
Nelson district - - - - - - - - - - - - - 1920 or 1921
Sugar and Mabel Lakes region - - - - - - 1920 or 1921
Upper Birkenhead River watershed - - - - 1920 or 1921

In the last two of these districts this year's discoveries establish the first record of pine infection for the district.

In the last named of these, infection was found at several points on white barked pine (Pinus albicaulis). This marks the first record of infection on this species within its actual range. (The only other record of infection on this species in North America is the case of a cultivated plant in the arboretum of the University of British Columbia to which the rust had evidently been transmitted from infection of Ribes nearby.)

On Currants and Gooseberries

Distribution of the rust on Ribes was mainly northward in 1926. In the coastal region it was found again at Bella Bella over 100 miles north of the northern limits of western white pine and an equal distance west of the western limits of white barked pine and in the interior of British Columbia on cultivated black currants at a number of places in the white pine-free areas of the Cariboo District as far north as Quesnel, almost 300 miles north of the international boundary. To the south the spread was very limited. Scouting for the disease on cultivated black currants in the interior Dry Belt of British Columbia which extends southward from the Cariboo District between the coastal and interior white pine belts resulted in the discovery of only two infection localities as against 20 last year. South of the international boundary the rust was found only in the Puget Sound region. Scouting by the Office of Blister Rust Control in southwestern Washington and northwestern Oregon failed to show the rust present again. Results in northern Idaho and northeastern Idaho were also negative.

Influence of Weather Conditions upon Spread and Development

With spring in 1926 one of the earliest on record through the Pacific Northwest, Ribes growth and leaf development in the study localities about sea level in southern British Columbia was in general a full month early.

*On the pines, while some aecia began to form earlier than ever before and while a few spores were liberated early, the main production and dispersal held back until closer to the usual time, coming between the middle of April and the last of May. During this period conditions were apparently ideal for infection of Ribes. Aeciospores were apparently as abundant generally as in 1925, while periods of high humidities and precipitation were frequent and well distributed. Yet, aside from study localities at higher elevations where Ribes leaf development was relatively later as compared with aeciospore production, very slight infection resulted generally and wide spread was practically confined to the north. Analysis of the season's infection data leads to the following main conclusions: Ribes leaf development at lower elevations including the main range of the most susceptible species through southern British Columbia and to the south was generally too far advanced to accept infection readily from aeciospores by the time the main production of the latter commenced. This resulted in relatively very slight infection even where the spores were abundant and inhibited wide spread through these regions away from the infected pines. Wide spread to the north is accounted for on the basis that spring is decidedly later here. Thus Ribes leaves were formed later and were in a favorable stage of development to be infected in the period of heavy aeciospore dispersal.

Susceptibility of Ribes

Work on the four species numerically important in the commercial pine regions of the Inland Empire region was greatly extended. These species are inland wild black currant (Ribes petiolare), smooth-stem gooseberry (Grossularia inermis), sticky currant (R. viscosissimum), and prickly currant (R. lacustre). Over 2000 plants of these species were tested in five different localities. Uredinial intensification and production of the telial stages was so extremely heavy on the wild black currant and smooth-stemmed gooseberry, particularly on the former, that it is feared that a 900-foot limit will not suffice to prevent transmission of serious infection to pines in the vicinity of large bodies of these species where the disease is present.

Infection and production of telial spores on the sticky and prickly currants was relatively very light.

The studies and analysis of distribution data indicate that under the conditions obtaining in the interior of British Columbia there is a decided difference among the species in their susceptibility to aeciospores as compared with their susceptibility to uredinial intensification. Compared with the cultivated black currant, all are evidently low in the former

*A few aecia were noted with one liberating spores as early as March 5, by Detwiler and Goodding, at pine infection localities in western Washington, while at one point in West Vancouver A. T. Davidson recorded a plentiful production commencing on March 11.

regard, i.e., in susceptibility to infection to the rust spores produced on the pines and consequently to spread of infection by these spores far from the pines. This is exceedingly fortunate for in susceptibility to uredinial intensification, i.e., local intensification of the disease on Ribes once they become infected, inland wild black currant, at least, is practically the equal of the cultivated species.

Preliminary results with maple-leaved currant (R. acerifolium), a species common in some places in the upper ranges of white pine in the Inland Empire region, indicate it to be highly resistant.

Damage to Western White Pine

Work on three permanent damage study plots at Daisy Lake, the worst pine infection center known in the West, was continued. Infection first became established on pines in this locality apparently in 1913. On the first plot only six of the original 178 small white pines ranging mainly from 15 to 20 feet in height remain alive. The plot covers one-third acre, and stink currant (R. bracteosum) and prickly currant (R. lacustre) are abundant on the ground immediately under the pines and over a considerable area adjacent.

The second plot which covers two-thirds of an acre borders the area of heavy stink and prickly currant growth. The pines are larger, ranging to 20 inches d. b. h. and 95 feet in height. Infection is relatively lighter with distance from the Ribes and increased size of the trees. Ninety-nine per cent of the latter are infected and 19 per cent have been killed. This latter occurred on the side of the plot bordering the Ribes and are of the smaller trees, ranging from 2 to 41 feet in height. Climbing of the larger trees indicates that the majority of them within a comparatively few years will lose their tops down to distances between 10 and 30 feet from the tip.

The third plot covers one-fourth acre and contains 190 trees about the same size as on the first plot, although more open grown. This plot is more than 300 yards away from the heavy stink currant growth, although some Ribes are present within 150 feet. Only 77 per cent of the pines show infection.

Additional studies of branch canker survival further substantiate previous results showing that the great majority of these infections die out before reaching the stem.

In general, heavy damage is as yet confined to the younger trees at places where abundant Ribes occur in close proximity to them and in localities where the disease has been longest established.

Susceptibility of Sugar Pine and Other White Pine Species

Seedlings of sugar pine (Pinus lambertiana), white bark pine (P. albicaulis), limber pine (P. flexilis), western white pine (P. monticola), eastern white pine (P. strobus), and Himalayan pine (P. excelsa) are being grown for test of their relative susceptibility to the rust. Seeds of the Swiss stone pine, alpine variety, (P. cembra-helvetica), Siberian stone pine (P. cembra-siberica), Korean pine (P. koraiensis), and Macedonian pine (P. peuce) have been planted to grow seedlings of these species for the same purpose. Seedlings of Armand pine (P. armandi) will be imported for test next spring. In order to speed up the test of sugar pine, about 50 seedlings of this species of varying ages were imported from California and planted at Daisy Lake this spring and were exposed to the rust this fall.

Other Conclusions

The conclusion that wide spread of the rust is accomplished by means of wind dissemination of aeciospores is further substantiated by the wide distribution on Ribes to the north in British Columbia.

No further evidence of wide spread from currants and gooseberries to pines as in the case reported on this area between Cheekye and Brackendale, B. C., where spores from large bodies of susceptible currants had evidently transmitted the disease to pines one-half mile to a mile distant has developed.

Mr. Chapman: What is the situation in Oregon?

Mr. Lachmund: Possibly the rust is permanently established in Oregon, but this is doubtful since the infection was sparse and not enough, it is believed, to infect the pines.

Mr. Chapman: Was the rust found at Ilwaco this year?

Mr. Lachmund: No.

Mr. Park: I see that we have with us Mr. Butler, Secretary of the American Forestry Association. We should like to have a few words from him at this time.

Mr. Butler: I am here to learn rather than contribute anything. I am glad to be able to attend this meeting. The reports give a very encouraging outlook for controlling and turning back the blister rust invasion.

Mr. Barss: Before we adjourn for lunch I should like to present my paper because there may be items in it which the resolutions committee may want to consider. Since this committee will meet during the noon hour I wish to ask your indulgence to allow me to read my paper at this time.

THE TEN-YEAR PROGRAM TODAY AND TOMORROW

by
H. P. Barss
Plant Pathologist, Oregon Agricultural College.

In 1923 a ten-year program for the campaign against the white pine blister rust in the far West was mapped out and adopted by the Western Blister Rust Conference which also recommended its adoption by the United States Department of Agriculture in order to insure continuity of effort and permanent progress in the work. The program called for cooperative expenditure of moneys and man-power on the part of the Federal Government on the one hand and the Western States and western private timber owners on the other.

This program was developed with the expectation that the disease would make its first important point of attack the great body of western white pine in northern Idaho and adjacent territory and that it would progress gradually southward reaching sugar pine regions long after the anticipated Idaho invasion. It turns out that these assumptions have had to be modified. In the fall of 1925 it was discovered that the disease had sent an advance wave of infection on currants that year as far south as Pacific City, in Oregon, and in 1926 there has been found a region of heavy intensification of the disease on western white pine on the Olympic Peninsula in western Washington. All this has made it perfectly clear to everybody that we have got to meet the advance of the disease on two battle fronts simultaneously. These recent developments led to the calling of a special meeting of the Conference at Portland, Oregon, on February 26th of this year. At this special meeting additional estimates were included in the program in order to meet adequately the new emergency. The hope was that the $73,500 which this added work would cost the Federal Government, might be added to the amount to be appropriated by Congress for the western work during the present fiscal year ending June 30, 1927.

It was found impossible to get this done, but every effort has been made by the Executive Committee of the Conference to have this figure added to the original amount suggested for the next fiscal year, ending June 30, 1928 under the ten-year program. Whether this is accomplished or not depends quite largely on the activity of the representatives of the timber interests and of the states most concerned, for the Federal Office of Blister Rust Control and the Federal Forest Service cannot themselves make active demand upon Congress since these agencies are but servants of the citizens of the United States. It is therefore the citizens and their local governments that must make active request for and urgently insist upon the protective campaign against this disease although only these Federal agencies can adequately direct it.

In order to give a bird's-eye view of the 10-year program as it not stands, I am setting before you a table as follows:

Modified 10-Year Blister Rust Program
for the Far West

For period Ending June 30 of the Year	Suggested Federal Expenditure	Suggested State and Private Expenditure	Additional Federal Expense Suggested by February 1926 Conference
1. 1925	$ 125,000*	$ 47,500	
2. 1926	140,000*	39,500	
3. 1927	175,000**	42,500	
4. 1928	200,000	47,500	$ 73,500
5. 1929	200,000	47,500	
6. 1930	300,000		
7. 1931	"	Not	
8. 1932	"	Estimated	
9. 1933	"		
10. 1934	"		

*Congress appropriated the amount called for.
**Congress appropriated only $160,000.

Taking the original program as a whole and considering the progress made and present status of the campaign it is clear that while much progress has already been made toward the objectives aimed at, there are certain directions in which progress has not been as rapid as expected. For example the cultivated black currant campaign which it was hoped to complete by last June must still go forward since the work is not yet completed although well along toward the end. Also, the investigational work under the Office of Forest Pathology has been making excellent progress but important studies have had to be postponed because of the costs of the work under way.

According to the 10-year program by the end of the present fiscal year, the third year, over $150,000 was to have been spent in local control work in actual eradication of Ribes in the National Forest Area of northern Idaho and adjoining sections, while during the present year the use of $25,000 of Federal funds and $25,000 state and private funds was planned for actual eradication work outside the National Forests. This makes a total in three years of $200,000 planned for actual eradication work in the northern center of commercial white pine production. Not all of the amount contemplated, however, has been spent in this way, since, on account of the Oregon invasion by the disease, some funds were diverted, I believe, to help Oregon carry out the new quarantine provisions of Quarantine No. 63, some also to accelerate the studies in California sugar pine and some to continue the uncompleted black currant eradication in California and elsewhere. Yet a considerable sum has been spent for actual local control although much if not most of this work to date has been conducted on an experimental basis, that is on areas selected to represent various types of terrain and forest conditions for which eradication methods and costs are being worked out.

Now we come to a consideration of the next fiscal year on our ten-year program, the year ending June 30, 1928. For that one year the program calls for an expenditure of $150,500 for local control in the Idaho-Washington-Montana area of which $30,000 is assigned to dollar for dollar contributions from states or from private timber owners. Here we are, ready for large-scale eradication work. As quoted a short while ago, it is estimated that at least 2,000,000 acres in this region will require such protection.

It is a matter of common sense to start in with this practical and permanent local control program by eradicating the Ribes first from those areas where such eradication will pay the best returns in white pine values saved and lying nearest to the advance of the disease. But it is my understanding that while we know pretty well where to expect the disease to invade first, nobody knows as yet just what forest types and areas on the map of the northern commercial white pine region are the ones where eradication work conducted next summer will bring the greatest net return in pine values protected from blister rust. To be sure the U. S. Forest Service has been conducting growth studies on western white pine and other species and that from such studies, if extensive enough, presumptive yield values for different regions, types and ages of white pine could be computed or at least fairly estimated and it is true that if this were done it would be possible for the Office of Blister Rust Control to apply such data to the territory along the danger zone first, and eventually to all, in such a way that a definite campaign plan for the actual eradication work could reasonably be arrived at, but it is perfectly plain that until the necessary forestry data are obtained and applied to the needs of our blister rust campaign not one step can be taken in the work with any reasonable assurance that it is in the right direction. Unless the required information can be obtained promptly we will be pursuing our work in the dark like a child in blindman's buff and money, time and effort will be misspent and wasted. Who knows how much?

The point of these remarks is this: it is absolutely imperative for this Conference to get behind the bill coming before Congress calling for aid from the Forest Experiment Stations in the West and furthermore the states concerned and the private timber owners must help to put it through. If this is not done, or some other way found to get at what is needed, our ten-year program cannot stand up and as sure as fate one of these days blister rust spores from the north will come drifting into our forests in countless millions and catch us with our past efforts leading to only partially effective results. This program of work by the forestry researchers is so essential and the need is so immediate that it is time for action now. It would seem desirable for the Forest Service and Forest Experiment Station men, if they have not already done so, to consult with the blister rust workers in order to be sure that the proposed bill provides adequately for the work that must be done. Then every shoulder to the wheel and push it through.

I am so thoroughly convinced that the salvation of our forests of white and sugar pine depends upon the salvation of our 10-year program and that the salvation of our 10-year program depends upon the aid we must get from technical forestry and get now, that I hardly feel like diverting your minds away from this one central major topic of the present conference even to refer to the supplemental $73,500 now being sought to cope with the blister rust situation as it has developed recently. Briefly, however, this added sum if granted will provide for:

1. Continued black currant (Ribes nigrum) eradication for which previous estimates proved insufficient.

2. Study of the progress and activities of the disease in the western Washington area.

3. Aid in making nursery inspection in Oregon in connection with the enforcement of the new quarantine and study of the progress of the disease in that state.

4. Control reconnaissance strengthened in Idaho, previous estimates being inadequate.

5. Additional work in chemical eradication of Ribes and in Ribes ecology.

6. Additional work in research on the disease itself under the Office of Forest Pathology which has not had enough funds to work with.

7. Additional experimental and survey work in California sugar pine regions.

The Conference should support this proposed supplemental work. Congress cut the present year's allotment from $175,000.00 as it appears on the 10-year program, to $160,000.00. Such cutting down adds to the peril of the situation. The estimates on which the original amounts on the 10-year program were based were not wild guesses. Likewise, the supplemental estimate just referred to is itemized definitely to provide for specific work that cannot now be taken up without crippling some other part of the program. If this conference and the interests here represented do not act in this matter, nobody is going to. If the appropriations needed do not go through it will not be possible for us to blame anybody but ourselves, at least until we have done everything in our power.

As a pathologist who has watched the progress of control over innumerable plant diseases, I find that again and again the study of the disease itself has unexpectedly provided a clue to effective control or to simpler and cheaper control practices. The ecology and pathogenicity of the disease must be studied in all its relationships and in every new locality invaded

by the disease. This work must not be cut but expanded as the disease advances into our own territory. Closely related to this research into the nature of the disease, is the detective work or intelligence service. Its object is to keep constantly in touch with every movement of the enemy, watching where it throws out its skirmish lines and where it advances its massed attacks, so that the leaders of our campaign against the blister rust can reasonably well predict what the disease may be expected to do under different circumstances and direct the control program accordingly. I feel that this important phase of the work has not been stressed in the past as it should have been. We must know every year what, in general at least, on every front, the disease has done that year. In war, the intelligence department doesn't determine the enemy's position once a month but from day to day and in this blister rust fight we must certainly do so from year to year.

Then, a great deal of information of inestimable value is to be derived from ecological studies on Ribes in relation to pine. Nature undoubtedly can be induced to cooperate in our campaign against the disease if we learn how Ribes behave under various natural and artificial circumstances. The critical moment for doing Ribes eradication work on any particular piece of ground in a way that will combine least expense and greatest permanency and the exact year a repetition of eradication will do most good, are facts that can be learned only by ecological studies. Unless these are carried on through there is a chance for great waste of good effort and money that could with proper knowledge be made to protect a much larger area.

I believe we should all aim to get as large a view of the entire problem in perspective as we can. I think we all must agree, however, that it is about time to get down to brass tacks, and, gathering all the necessary information together as soon as possible, map out in detail the blister rust campaign for the coming years as it relates to every valuable piece of actual or potential western white pine land and then do the same, when the time comes, for the sugar pine forests.

In thinking over how best to go about actual large-scale local control work the question comes up if it is not true that the first step must be taken by the Forest Service. Nobody else can have the knowledge or the authority (in case of our national forests) necessary to designate or map out in any region under consideration, those areas which could rightly be called white pine-growing areas of the first-rank or No. 1 white pine sites, those which could be delineated as second-rate or No. 2 white pine areas and so on. It appears to be only the professional foresters who can be expected logically to make this first essential determination. Then it seems to be only they who can follow up by calculating what margin of income over and above total costs these different grades of pine land will produce in order that the Office of Blister Rust Control may thereafter calculate eradication costs and determine what portion of the No. 1, No. 2,

No. 3, etc., pine-growing sites in a region will justify the expense of local control as worked out through their surveys and experiments.

If these assumptions are correct, isn't it true that the U. S. Forest Service must now step forward with the backing of this Conference and prepare to make these maps of good, medium and poor white pine areas and to estimate their prospective power to yield income over investment? The Forest Service and Station workers must here and now tell this Conference what they need in men, money and time to accomplish this and we must see to it that the proposed bill going up to Congress provides all they need. This work must eventually cover both the western white and the sugar pine regions before completed and must be planned so as to dovetail into that of the Office of Blister Rust Control. In accomplishing these things the Forest Service and Forest Experiment Stations will be discharging their great responsibility to the people of the West as guardians of the National Forest Reserves. We pledge them our best support and ask their best efforts.

Mr. Park: Since there is no discussion of Professor Barss's paper we stand adjourned until 2 o'clock.

AFTERNOON SESSION

The meeting was called to order by Mr. Park at 2:15 P.M.

Mr Park: We shall now have a report regarding the work in Montana by Mr. Parker. Since he is not present, has he a representative here? If there is no one here to speak for Montana, we will hear from Mr. Bush for the State of Idaho. I see that Mr. Bush is not here. Mr. Humiston, will you report for Idaho?

Mr. Humiston: I know only about the work that is being done by the fire protective associations. Each of the five protective associations has a cooperative agreement with the Office of Blister Rust Control. Each association provides one man who is being trained by the Office of Blister Rust Control to take leadership in this work in each association. In addition the agreement provides that all members of the association shall, incidental to their other work, scout for the disease. The Office of Blister Rust Control is to train these men so that they will know what to look for. The Potlatch Association has 105 men scouting on 765,000 acres. They are constantly on the watch for the disease and give us good inspection throughout the territory. After the season is over our leader goes to the Spokane office and is sent out on the other projects that are being carried on by the Office of Blister Rust Control. He is trained in eradication methods so that he knows how this work is carried on. He has also been sent into British Columbia to study the disease itself. What is true for the Potlatch Association is also true for the other associations. Dr. Hubert is here and can tell you regarding the eradication of the cultivated black currant in Idaho.

Mr. Hubert: I know very little regarding the black currant eradication work in Idaho, since that is being handled by Mr. Kjosness, Commissioner of Agriculture.

Mr. Park: Mr. Joy, will you report for the State of Washington?

Mr. Joy: There is not much to report. My predecessor gave good moral support to the work. When the work of the Office of Blister Rust Control gets far enough advanced to say what should be done, we will go ahead. There is little white pine in Washington except in the northeastern part. There is no commercial white pine on the coast side. I feel that just as soon as Mr. Wyckoff outlines a plan of action for us to carry out, we will go ahead.

Mr. Park: Since Mr. Elliot of the State of Oregon and Mr. Pratt for the State of California are not present we shall next hear from the Forest Service. Mr. Morrell, will you report for District One?

Mr. Morrell: I have very little to report. District One has more interest in this problem than any other district. The blister rust organization is working well with the Forest Service. I think that the Experiment Station has been working with Mr. Wyckoff and has given any assistance possible. The cooperation between the two organizations is going on very smoothly indeed.

Mr. Park: Mr. Granger of District Six is not here. I believe that Mr. Chapman has received some word from Mr. Show of District Five.

Mr. Chapman: Mr. Show sent me word that Mr. Hutchinson would represent him here at this meeting. Later he notified me that Mr. Hutchinson would not be here because his authorization did not go through. However, I can say that both District Five and Six are giving good cooperation.

Mr. Wyckoff: We are receiving the very best of cooperation from all of the Forest Service Districts. We have secured considerable information from them and I am sure that they will give us more as it is needed.

Mr. Park: We shall now have a report regarding the situation in British Columbia by Mr. Davidson.

Mr. Davidson: I have very little to say. No funds have been provided for the work in British Columbia, consequently I am not very familiar with the situation. Mr. Lachmund is better informed regarding the situation in British Columbia than I am.

Mr. Lachmund: The white pine has less value than the cultivated black currant in British Columbia. The work that the Canadians have done has been cooperative. In 1922 they established the range of the disease in

British Columbia. They used airplanes to establish its range and without these it would have been impossible to do the work. Much of the information regarding the early history of the rust has come from the Canadians. Since their work has stopped they have cooperated as fully as possible and we owe them a word of appreciation for their aid.

Mr. Park: We shall now hear from Mr. Weidman of the Forest Service.

Mr. Weidman: I interpreted the topic assigned to me rather broadly. After listening to the papers of Professor Barss and Mr. Wyckoff I obtained a different idea of my subject as you expected me to discuss it. As a result I have revised my original paper.

NEED FOR FURTHER STUDY OF GROWTH AND YIELD IN THE WESTERN WHITE PINE TYPE IN RELATION TO BLISTER RUST CONTROL

by

R. H. Weidman, Director,
Northern Rocky Mountain Forest Experiment Station

Perhaps the most important need for further yield study, from the standpoint of blister rust control, deals with the ratio of western white pine to other species in the much mixed stands of this forest type. The point which makes the matter especially urgent to know about is that the proportion of species changes as the stand develops from youth to maturity. The need is to know, for example, if a stand which contains 15 per cent white pine at 20 years of age will have a greater or less percentage of that species at 80,90, or 100 years. It is necessary to have the answer to this question in order to know whether eradication of Ribes will be financially profitable in young stands containing low proportions of white pine.

The common condition in the western white pine type is a mixture of a half-dozen or more species, including white pine, larch, Douglas fir, white fir, Engelmann spruce, hemlock, and cedar. In these stands white pine has a high stumpage value and the other species have little or no value at present. If the ultimate cost of eradication--and several eradications may be necessary in the life of the young stand--will be greater than the stumpage value at maturity of the white pine to be saved, then it would be a mistake to eradicate. Factors which influence the problem in addition to the changing ratio of species are site quality and density of the stands. Naturally the yield to be expected at any given age varies according to whether the site is good, fair, or poor. Yield also varies through a wide range from fully stocked to very open stands.

In order to show the relationship of all this to Ribes eradication, the cost of eradication in several hypothetical stands is here carried forward from youth to maturity. The figures given are based on existing

normal yield tables for three qualities of site, assuming fully stocked stands except as indicated. Four conditions of composition are assumed: 20, 40, 60, and 80 per cent white pine with the remainder of mixed species which have not been differentiated. The standard formula for calculating profits in forestry was used with such modification as was necessary. The rotation used was 100 years and a single eradication was assumed to be done at 20 years of age. An interest rate of 3 per cent was chosen to correspond with that used in damage appraisal calculations of the U. S. Forest Service in Idaho and Montana. Two sets of stumpage prices were used, present and future. The following present prices were taken: $9.00 a M for white pine and -$6.00 (minus) for the secondary species. For future prices the following: $20.00 for white pine and $1.50 for the secondary species. Present tax rates of 10 cents per acre were used up to 80 years, and 6 cents a M for white pine and 1½ cents a M for secondary species were used for the timber after it reached merchantable size. Cost of protection was placed at 10 cents an acre. Cost of eradication was taken from Western White Pine Blister Rust Proceedings for 1925 at $2.22 an acre for dense reproduction, $5.64 for open reproduction, $0.50 for dense mature timber and $2.57 for open mature timber. Using these data, the calculations give the following tabulated results:

Net Profit per Acre at 100 Years

A. Present Stumpage Prices Used			
Per cent of white pine in stand	Site I	Site II	Site III
80	$ 194.84	$115.36	$ 39.10
60	32.63	-2.68	-34.76
40	-129.58	-120.71	-108.62
20	-291.79	-233.75	-182.48

B. Future Stumpage Prices Used			
80	$ 793.27	$ 551.05	$ 312.05
60	590.39	403.40	219.64
40	387.51	255.76	127.23
20	184.63	108.12	34.82

The variation in profits is due, of course, to changes in percentage of white pine. The eradication costs and carrying charges are exactly the same in all cases. Under these conditions, using present stumpage prices, it would apparently pay to eradicate Ribes only in case the percentage of white pine present is 56 per cent or over on Site I, 63 per cent on Site II and 69 per cent on Site III. In using the future stumpage prices here assumed, eradication would pay regardless of composition, though the margin of profit would be greatly cut down in the case of low percentages of white pine.

As understocked stands will also have to be dealt with in the work, an example of that is here given in which the stocking is 50 per cent of

normal. Figures for Site II only are given. In this case it would pay to eradicate only if the stands contain 27 per cent or more of white pine.

Net Profit per Acre at 100 Years
Using Future Stumpage Prices
Stand 50% Stocked

Percentage of white pine	Site II
80	$ 195.18
60	111.35
40	47.53
20	-26.30

There are several matters to be pointed out in connection with the above calculations. One is that the figures show the importance of determining the percentage of white pine in the stand before eradication and also the importance of knowing whether the percentage of this species will increase or decrease as the stand advances in age. What such changes are are not known and no assumptions can therefore be made in this connection. This specifically is the point at which further study is needed.

A point that needs comment in the above calculations is that the carrying costs (taxes and protection) amount to a huge figure by the end of the rotation as compared with the cost of eradication compounded to that time. The eradication costs here used have an end value of $5.32 for the less expensive eradication and $60.02 for the most expensive, whereas the end value of taxes and protection amount to $112.63. Considering the figures as given, the natural conclusion would be that the growing of timber as a private enterprise is not profitable under present conditions except on the best sites, and then only in stands containing a high proportion of white pine. The situation is not as hopeless as this, however, for the reason that any private concern which owns enough timber to stay permanently in business, i.e., to grow each year as much timber as it cuts, would logically not be justified in carrying forward the protection and taxes in this way, but would naturally charge them off currently as a part of the cost of running the business. In doing this it would easily be profitable to eradicate Ribes several times in the life of the stand if necessary. In the case of state and federal owned timber, of course, there are no taxes and the cost of protection is not carried forward as a charge against the final crop.

There are several other needs for further study of growth and yield in the western white pine type. One of these deals with the problem of how to apply the normal yield tables that are just being completed by the Experiment Station. As a normal yield table is based on fully-stocked stands and is therefore a sort of standard yard stick, and as the natural forest has a wide range of stocking, it becomes necessary to determine certain correction factors that must be used to apply the yard stick.

Another need is to determine the influence, if any, of various compositions of species in the stand upon the total yield per acre. Does a stand with 30 per cent white pine and 70 per cent white fir, hemlock, and cedar have a greater total yield than one in which the ratio, for example, is 70 per cent white pine and 30 per cent other species? There are the combinations of white pine with intolerant associates such as larch and Douglas fir, then there are the combinations of white pine with more tolerant associates like cedar and hemlock. The Experiment Station already has field data on this problem which, when it is compiled, will throw light on this problem. Another need is to know what is the best stocking to produce saw timber. This will be somewhat less than the full, or what we call normal stocking, which produces the maximum cubic volume for a given site and age.

Classification of forest land into good, fair, and poor sites will naturally be necessary in order to state which areas have high productive capacity for white pine to make eradication feasible. Although site classification has not been undertaken on an extensive scale on the National Forests, forest research has developed accepted methods for site classification and this can therefore be carried out in connection with Ribes eradication. Research methods are far enough developed along this line to make this practicable.

As stated at the beginning, the study most needed deals with determining the ratios of white pine to other species in mixture and how they change with increasing age of the stands. A study of this problem can be conducted best on permanent sample plots, but it can also be undertaken, with assurance of getting very valuable preliminary results, by taking temporary sample plots. Two or three seasons' work should yield a basis for determining fairly satisfactorily under what conditions Ribes eradication would be profitable. The results of such study would fill the need until the final results from permanent sample plots could be secured.

Mr. Park: Have you anything to say regarding Mr. Weidman's paper, Mr. Humiston?

Mr. Humiston: We want to know whether it will pay us to hold our young timber until maturity. The whole thing depends upon what the future value of white pine will be. All these yield tables and growth studies are of no value unless they answer this question. We must know approximately what stumpage will be worth in the future. In other words take the work of Weidman and Hubert and translate it into dollars and cents.

Mr. Weidman: Isn't that the lumberman's job?

Mr. Humiston: We do not have the technical information or means.

Mr. Weidman: I attempted last spring to work out something along this line. If an outfit has enough timber, that is, is a big company, they

could charge off taxes and protection as a current expense.

Mr. Humiston: Weidman is on the right track. The state has no tax burden and neither does the Forest Service. What is good policy for the state and Forest Service, would not justify private investment. If the private owner has a continuous operation he may be justified.

Mr. Barss: It is a matter of gratification that all understand the problem. All agencies are focussing on the problem of the private owner in order to help him determine what to do. Lay the facts before him. Some areas will justify protection now and some not until a future time. We must take the figures that we have now, based on our experience, then examine the areas and give the private owner and others what the status of the thing is at present.

Mr. Wyckoff: It appears to me that one thing stands out in this discussion. If Weidman is given the proper support he can work the thing out.

Mr. Park: We will now have a word from Mr. Peck of the Forest Service at Denver.

Mr. Peck: The question I have in mind does not belong to this particular question. Just to what extent is local control justified? If you have a valuable stand what effect do your neighbors' holdings have upon it? Is the fight local?

Mr. Wyckoff: The fight is entirely local. The radius of safety, based on eastern conditions, is 900 feet. If all of Idaho white pine type was infected, one section could be protected if so desired.

Mr. Park: We shall now have the report of the resolutions committee.

RESOLUTIONS ADOPTED AT MEETING OF TRUSTEES OF WESTERN WHITE PINE BLISTER RUST CONFERENCE

1. Appreciation

The Conference expresses its appreciation of the work of the Offices of White Pine Blister Rust Control and Forest Pathology, United States Department of Agriculture, on the excellent work accomplished during the past year and the encouraging results obtained. The Conference also thanks the Federal Forest Service officers, the timber protective associations, the state agencies and all the various individuals and organizations which have so heartily and effectively cooperated in the campaign.

2. Quarantine Progress

This Conference believes that the principle of the disinfection and certification of nursery stock grown in dangerous sections, as provided in Federal Quarantine No. 63, is a step in the right direction in the development of better plant protection measures in the United States, while recognizing with appreciation the cooperation already generously given by all states.

3. State Cooperation

The Conference respectfully but insistently urges upon the legislatures of the western states concerned, the need for increasing the direct appropriations necessary to support and extend the blister rust control work conducted by the agencies of the Federal Government. The Conference recognizes the mutual obligation resting on the western states and the Federal Government.

4. Blister Rust Appropriation

The Conference urges upon the representatives of the western states in Congress the necessity for the appropriation of $273,500 for the control of the white pine blister rust in the West during the fiscal year 1928 and requests their most active efforts in support of this item in full. The responsibility of the Federal Government to carry through the 10-year program of the Blister Rust Conference, supplemented to take care of the coastwise advance of the disease, is clear when it is considered that over half of the white pine acreage in this region is in Federal ownership. The future growth and production of western white and sugar pine in the far West is primarily a matter of public rather than private interest and Federal aid should not be contingent, as has been the eastern custom, on matching of Federal funds by state and private agencies.

5. Federal Forest Experiment Station Work

Recognizing that the protection of the many billions of feet of white pine on national forests of the region, as well as the production of future forest crops in the very large acreage of white pine lands in these national forests, is dependent on control of blister rust, the Conference recommends that western senators and congressmen make all possible effort to secure passage of the Johnson Bill, H. R. 12335, making available to the United States Forest Service Experiment Stations $50,000 to be used to carry on investigations necessary for the intelligent and economical handling of the blister rust control work. The wisdom and economy of such an appropriation as a means of saving resources represented by these government owned forests is likewise urged upon the Budget Bureau and the United States Department of Agriculture.

6. Thanks for Efforts in Congress

The Conference desires to express its cordial and sincere appreciation of the energetic efforts of the senators and representatives of the western states in Congress in furthering a program to protect and perpetuate our white and sugar pine forests through Federal appropriations for the white pine blister rust work in the West.

7. Blister Rust Circular for the West

The Conference suggests that it would be an assistance to the western campaign if some sort of circular discussing briefly the history of the work in the West and outlining the program for the future handling of the disease should be prepared by Federal blister rust workers to be distributed throughout this territory.

Mr. Humiston: Mr. Potter of the Timberman has made us a good offer regarding printing of the summary of the work. Tell us about it, Mr. Potter.

Mr. Potter: The Timberman will gladly print the article mentioned by the resolutions committee if it is not too long, say 10,000 words. We shall be glad to supply a limited number of separates, say 1000, free of charge.

Mr. Humiston: Do Mr. Wyckoff and Dr. Boyce undertake to prepare this article?

Mr. Wyckoff: We shall be glad to do it. We should like to have suggestions.

Mr. Barss: We simply desire a simple description of the disease, its distribution,and the progress that has been made in combating it.

Mr. Humiston: We need this pamphlet at this time for distribution to our legislators.

Mr. Graham: I have been very much interested in this meeting. I represent the Great Northern Railway. We do not have any timbered land. I have attended some of your meetings before. I do not believe that the problem is generally understood. This little group of men is doing good work. More cooperation can be gotten generally. This little circular should be written plainly and simply. Information should be given out through the press.

Mr. Chapman: If it is ready by January, it could be distributed to the legislators in the white pine states which are considering this problem.

Mr. Wyckoff: We shall be glad to do this. Of course, it must be approved by the Washington Office and this takes time. If the Blister Rust Executive Committee desires to issue this circular, I shall be glad to supply them any information which they may desire.

Mr. Lachmund: I shall also be glad to furnish any information desired from the Office of Forest Pathology.

Mr. Humiston: I believe that the Executive Committee can and should issue this circular.

Mr. Barss: I would suggest that all the details of the life cycle of the disease be not mentioned in this article. I move that the Executive Committee be authorized to prepare and issue this article.

Mr. Chapman: I second that motion.

Mr. Park: You have heard the motion. All in favor indicate by the usual sign. The motion is carried. Is there any further business to come before this Conference? Since there seems to be nothing further, the meeting stands adjourned.

Finis

ATTENDANCE

Fred Ames, Forest Service, Portland, Oregon.
H. P. Barss, Oregon Agricultural College, Corvallis, Oregon.
J. S. Boyce, Office of Forest Pathology, U. S. Dept. of Agri.,Portland, Ore.
O. V Butler, Secretary, American Forestry Association, Washington, D. C.
R. H. Chapler, Western Forestry and Cons. Ass'n and Oregon Forest Fire Patrol Ass'n, Portland, Oregon.
C. S. Chapman, Weyerhaeuser Timber Co., Tacoma, Wash.
Mr. Churbeck, Forestry Dept., Crown-Willamette Paper Co., Portland, Ore.
A. T. Davidson, Dominion Government of Canada, Vancouver, B. C.
F. A. Elliot, State Forester, Oregon, Salem, Oregon.
F. W. Graham, Ass't Gen. Agricultural Development Agent, Great Northern Railway Co., Seattle, Wash.
J. D. Guthrie, Forest Service, Portland, Oregon.
E. E. Hubert, Forestry Dept. Univ. of Idaho, Moscow, Idaho.
W. D. Humiston, Potlatch Lumber Co., Potlatch, Idaho.
Geo. C. Joy, State Supervisor of Forestry, Olympia, Wash.
Porter King, Office State Forester, Salem, Oregon.
J. F. Kümmel, Forest Service, Portland, Oregon.
H. G. Lachmund, Office of Forest Pathology, U.S.Dept. of Agri.,Portland,Ore.
E. H. McDaniels, Forest Service, Portland, Oregon.
J. Mielke, Office of Forest Pathology, U. S. Dept. of Agri. Portland, Ore.
Fred Morrell, Forest Service, Missoula, Montana.
T. T. Munger, Forest Service, Portland, Oregon.
L. A. Nelson, West Coast Lumbermen's Association, Portland, Oregon.
C. A. Park, Oregon State Board of Horticulture, Salem, Oregon.
Allen S. Peck, Forest Service, Denver, Colorado.
H. L. Potter, The Timberman, Portland, Oregon.
C. C. Scott, Secretary and Manager, Forest Fire Patrol Ass'n, Portland, Ore.
C. R. Stillinger, Office of Blister Rust Control, U. S. Dept. of Agri., Spokane, Wash.
J. L. Wallen, American Lumberman, Portland, Oregon.
I. Waring, Gen. Agent, American Railway Express, Portland, Oregon.
R. H. Weidman, Forest Service, Missoula, Montana.
S. N. Wyckoff, Office of Blister Rust Control, U. S. Dept. of Agri., Spokane, Wash.